AMENDMENTS TO THE CLAIMS

The listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) An optical memory reproduction apparatus which reproduces data from an optical memory medium [[(2)]] comprising: cores [[(21)]] each of which constitutes a planar optical waveguide, and clads [[(22)]] which sandwich each core [[(21)]], and having: a data image [[(203)]] in which data is recorded as a scattering factor; and a pair of positioning marks [[(201, 202)]] which are respectively scattering factors required for positioning, at an interface between a core [[(21)]] and a clad [[(22)]] or in the core [[(21)]],

the optical memory reproduction apparatus comprising:

a light source [[(11)]] which emits: a read light [[(103)]] which is caused to enter the core [[(21)]] from an end surface of the optical memory medium [[(2)]], travels while spreading in the core [[(21)]], and is coupled with the core [[(21)]] to form an optical coupling area in such a manner that the optical coupling area includes the data image [[(203)]]; and a pair of positioning lights [[(101, 102)]] which are caused to enter the core [[(21)]] with offsets with respect to the read light [[(103)]] in opposite directions along a thickness direction of the core [[(21)]], travels in the core [[(21)]], and are coupled with the core [[(21)]] to form optical coupling areas in such a manner that the optical coupling areas include the pair of positioning marks [[(201, 202)]];

a data reproduction light imaging element [[(133)]] which receives a data reproduction light [[(1031)]] generated due to scattering and interference of the read light [[(103)]] in the data image [[(203)]];

a data reproducing unit [[(14)]] which reproduces data imaged by the data reproduction light imaging element [[(133)]];

a positioning mark light receiving element [[(131, 132)]] which receives a pair of positioning mark lights [[(1011, 1021)]] generated due to scattering and interference of the pair of positioning lights [[(101, 102)]] in the pair of positioning marks [[(201, 202)]]; and

a light source position control unit [[(16)]] which controls an incidence position of the read light [[(103)]] with respect to the core [[(21)]] in the thickness direction thereof based on intensities of the pair of positioning mark lights [[(1011, 1021)]] detected by the positioning mark light receiving element [[(131, 132)]].

2. (Currently Amended) The optical memory reproduction apparatus according to claim 1, wherein a condensing pattern of each positioning light [[(101, 102)]] is a dot-like shape or a circular shape.

3. (Currently Amended) The optical memory reproduction apparatus according to claim 1, wherein the light source [[(11)]] alternately emits the pair of positioning lights [[(101, 102)]] in a time-sharing manner.

4. (Currently Amended) An optical memory reproduction apparatus which reproduces data from an optical memory medium [[(2)]] comprising: cores [[(21)]] each of which constitutes a planar optical waveguide; and clads [[(22)]] which sandwich each core [[(21)]], and having: a pair of data images [[(2011, 2012)]] in which the data is recorded as a scattering factor; and a pair of positioning marks [[(201, 202)]] which are respectively scattering factors required for positioning, at an interface between a core [[(21)]] and a clad [[(22)]] or in the core [[(21)]],

the optical memory reproduction apparatus comprising:

a light source [[(11)]] which emits a pair of positioning/read lights [[(101, 102)]] which are caused to enter the core [[(21)]] from an end surface of the optical memory medium [[(2)]] at different positions in a thickness direction of the core [[(21)]], travel while spreading in the core [[(21)]], and are coupled with the core [[(21)]] to form optical coupling areas in such a manner that the optical coupling areas respectively include the pair of data images [[(2011, 2012)]] and the pair of positioning marks [[(201, 202)]];

a data reproduction light imaging element [[(133)]] which receives a pair of data reproduction lights [[(1012, 1022)]] generated due to scattering and interference of the pair of positioning/read lights [[(101, 102)]] in the pair of data images [[(2011, 2012)]];

a data reproducing unit [[(14)]] which reproduces data imaged by the data reproduction light imaging element [[(133)]];

a positioning mark light receiving element [[(131, 132)]] which receives a pair of positioning mark lights [[(1011, 1021)]] generated due to scattering and interference of the pair of positioning/read lights [[(101, 102)]] in the pair of positioning marks [[(201, 202)]]; and

a light source position control unit [[(16)]] which controls incidence positions of the pair of positioning/read lights [[(101, 102)]] with respect to the core [[(21)]] in the thickness direction thereof based on intensities of the pair of positioning mark lights [[(1011, 1021)]] detected by the positioning mark light receiving element [[(131, 132)]].

5. (Currently Amended) The optical memory reproduction apparatus according to claim 4, wherein a condensing pattern of each positioning/read light [[(101, 102)]] is a dot-like shape or a circular shape.

6. (Currently Amended) The optical memory reproduction apparatus according to claim 4, wherein the light source [[(11)]] alternately emits the pair of positioning/read lights [[(101, 102)]] in a time-sharing manner.

7. (Currently Amended) An optical memory reproduction apparatus which reproduces data from an optical memory medium [[(2)]] comprising: cores [[(21)]] each of which constitutes a planar optical waveguide; and clads [[(22)]] which sandwich each core [[(21)]], and having: a data image [[(203)]] in which data is recorded as a scattering factor; and a pair of positioning marks [[(201, 202)]] which are respectively scattering factors required for positioning, at an interface between a core [[(21)]] and a clad [[(22)]] or in the core [[(21)]],

the optical memory reproduction apparatus comprising:

a light source [[(11)]] which emits a positioning/read light [[(104)]] which has a elliptic or rectangular cross section, is caused to enter the core [[(21)]] from an end surface of the optical memory medium [[(2)]] at an angle by which a longitudinal direction of the cross section is not parallel with the interface, travels while spreading in the core [[(21)]], and is coupled with the core [[(21)]] to form an optical coupling area in such a manner that a central portion of the optical coupling area includes the data image [[(203)]] and both end portions of the optical coupling area includes the pair of positioning marks [[(201, 202)]];

a data reproduction light imaging element [[(133)]] which receives a data reproduction light [[(1031)]] generated due to scattering and interference of the positioning/read light [[(104)]] in the data image [[(203)]];

a data reproducing unit [[(14)]] which reproduces data imaged by the data reproduction light imaging element [[(133)]];

a positioning mark light receiving element [[(131, 132)]] which receives a pair of positioning mark lights [[(1011, 1021)]] generated due to scattering and interference of the positioning/read light [[(104)]] in the pair of positioning marks [[(201, 202)]]; and

a light source position control unit [[(16)]] which controls an incidence position of the positioning/read light [[(104)]] with respect to the core [[(21)]] in a thickness direction thereof based on intensities of the pair of positioning mark lights [[(1011, 1021)]] detected by the positioning mark light receiving element [[(131, 132)]].

8. (Currently Amended) The optical memory reproduction apparatus according to claim 1, claim 4 or claim 7, wherein the light source position control unit [[(16)]] compares the intensities of the pair of positioning mark lights [[(1011, 1021)]] with each other, determines a movement direction of the light emitted from the light source [[(11)]] and moves the light in accordance with a result of the comparison, and controls the incidence position of the light emitted from the light source [[(11)]] in such a manner that an intensity difference becomes zero.

9. (Currently Amended) An incidence positioning method for a read light [[(103)]] in an optical memory reproduction apparatus applying the read light [[(103)]] which travels while spreading to a core [[(21)]] portion on an end surface of an optical memory medium [[(2)]] comprising cores [[(21)]] each of which constitutes a planar optical waveguide and clads [[(22)]] which sandwich each core [[(21)]] and having a data image [[(203)]] in which data is recorded as a scattering factor and a pair of positioning marks [[(201, 202)]] which are respectively scattering factors required for positioning, at an interface between a core [[(21)]] and a clad [[(22)]] or in the core [[(21)]], the read light [[(103)]] being coupled with the core [[(21)]] to form an optical coupling area in such a manner that the optical coupling area includes the data image [[(203)]], the optical memory reproduction apparatus reproducing data based on a data reproduction light [[(1031)]] generated due to scattering and interference of the read light in the data image [[(203)]],

the incidence positioning method comprising:

causing a pair of positioning lights [[(101, 102)]] to enter the end surface of the optical memory medium [[(2)]] in such a manner that the pair of positioning lights have offsets with respect to the read light [[(103)]] in opposite directions along a thickness direction of the core [[(21)]];

forming an optical coupling area by coupling of the pair of positioning lights [[(101, 102)]] which have entered the core [[(21)]] with the core [[(21)]] in such a manner that the optical coupling area includes the pair of positioning marks [[(201, 202)]];

receiving by a positioning mark light receiving element [[(131, 132)]] a pair of positioning mark lights [[(1011, 1021)]] generated due to scattering and interference of the pair of positioning lights [[(101, 102)]] in the pair of positioning marks [[(201, 202)]]; and

controlling an incidence position of the read light [[(103)]] emitted from the light source [[(11)]] with respect to the core [[(21)]] in a thickness direction thereof based on intensities of the pair of positioning mark lights [[(1011, 1021)]] which have entered the positioning mark light receiving element [[(131, 132)]].

10. (Currently Amended) The incidence positioning method according to claim 9, wherein a condensing pattern of each positioning light [[(101, 102)]] is a dot-like shape or a circular shape.

11. (Currently Amended) The incidence positioning method according to claim 9, wherein the pair of positioning lights [[(101, 102)]] are alternately emitted in a time-sharing manner.

12. (Currently Amended) An incidence positioning method for a pair of positioning/read lights [[(101, 102)]] in an optical memory reproduction apparatus applying the pair of positioning/read lights [[(101, 102)]] which travel while spreading to a core [[(21)]] portion on an end surface of an optical memory medium [[(2)]] comprising cores [[(21)]] each of which constitutes a planar optical waveguide and clads [[(22)]] which sandwich each core [[(21)]] and having a pair of data images [[(2011, 2012)]] in which data is recorded as a scattering factor and a pair of positioning marks [[(201, 202)]] which are respectively scattering factors required for positioning, at an interface between a core [[(21)]] and a clad [[(22)]] or in the core [[(21)]], the pair of positioning/read lights [[(101, 102)]] being coupled with the core [[(21)]] to form optical coupling areas in such a manner that the optical coupling areas include the pair of data images [[(2011, 2012)]], the optical memory reproduction apparatus reproducing data based on a pair of data reproduction lights [[(1012, 1022)]] generated due to scattering and interference of the pair of positioning/read lights in the pair of data images [[(2011, 2012)]],

the incidence positioning method comprising:

forming optical coupling areas by coupling the pair of positioning/read lights [[(101, 102)]] which have entered the core [[(21)]] with the core [[(21)]] in such a manner that the optical coupling areas include the pair of positioning marks [[(201, 202)]];

receiving by positioning mark light receiving element [[(131, 132)]] a pair of positioning mark lights [[(1011, 1021)]] generated by scattering and interference of the pair of positioning/read lights [[(101, 102)]] in the pair of positioning marks [[(201, 202)]]; and

controlling incidence positions of the pair of positioning/read lights [[(101, 102)]] emitted from the light source [[(11)]] with respect to the core [[(21)]] in a thickness direction thereof based on intensities of the pair of positioning mark lights [[(1011, 1021)]] which have entered the positioning mark light receiving element [[(131, 132)]].

13. (Currently Amended) The incidence positioning method according to claim 12, wherein a condensing pattern of each positioning/read light [[(101, 102)]] is a dot-like shape or a circular shape.

14. (Currently Amended) The incidence positioning method according to claim 12, wherein the pair of positioning/read lights [[(101, 102)]] are alternately emitted in a time-sharing manner.

15. (Currently Amended) An incidence positioning method for a positioning/read light [[(104)]] in an optical memory reproduction apparatus applying the positioning/read light [[(104)]] which has an elliptic or rectangular cross section and travels while spreading to a core [[(21)]] portion on an end surface of an optical memory medium [[(2)]] at an angle by which a longitudinal direction of the cross section is not parallel with an interface between a core [[(21)]] and a clad [[(22)]], the optical memory medium [[(2)]] comprising cores [[(21)]] each of which constitutes a planar optical waveguide and clads [[(22)]] which sandwich each core [[(21)]] and having a data image [[(203)]] in which data is recorded as a scattering factor and a pair of positioning marks [[(201, 202)]] which are respectively scattering factors required for positioning at the interface between the core [[(21)]] and the clad [[(22)]] or in the core [[(21)]], the positioning/read light [[(104)]] being coupled with the core [[(21)]] to form an optical coupling area in such a manner that the optical coupling area includes the data image [[(203)]], the optical memory reproduction apparatus reproducing data based on a data reproduction light [[(1031)]] generated due to scattering and interference of the positioning/read light in the data image [[(203)]],

the incidence positioning method comprising:

forming the optical coupling area by coupling the positioning/read light [[(104)]] which has entered the core [[(21)]] with the core [[(21)]] in such a manner that both end portions of the optical coupling area include the pair of positioning marks [[(201, 202)]];

receiving by a positioning mark light receiving element [[(131, 132)]] a pair of positioning mark lights [[(1011, 1021)]] generated due to scattering and interference of the positioning/read light [[(104)]] in the pair of positioning marks [[(201, 202)]]; and

controlling an incidence position of the positioning/read light [[(104)]] emitted from the light source [[(11)]] with respect to the core [[(21)]] in a thickness direction thereof based on intensities of the pair of positioning mark lights [[(1011, 1021)]] which have entered the positioning mark light receiving element [[(131, 132)]].

16. (Currently Amended) The incidence positioning method according to claim 9, claim 12 or claim 15, wherein the step of controlling a position of the light source [[(11)]] compares the intensities of the pair of positioning mark lights [[(1011, 1021)]] with each other, determines a movement direction of the light emitted from the light source [[(11)]] and moves the light in accordance with a result of the comparison, and controls the incidence position of the light emitted from the light source [[(11)]] in such a manner that an intensity difference becomes zero.